

An Investigation of the Relation Between Life Experience, Personality Characteristics, and General Susceptibility to Illness

LAWRENCE E. HINKLE, JR., M.D., WILLIAM N. CHRISTENSON, M.D.,
FRANCIS D. KANE, M.D., ADRIAN OSTFELD, M.D.,
WILLIAM N. THETFORD, Ph.D., and HAROLD G. WOLFF, M.D.

EPISODES of illness are not distributed at random among the members of the general population. Even among groups of people of similar ethnic and social background, living in the same general environment, and sharing the same occupation over a period of many years, the likelihood of becoming ill is different from person to person. Differences in age, sex, and opportunities to encounter trauma or infection do not entirely account for this variability. In several groups in which the distribution of illness episodes has been investigated, 25 per cent of the members have experienced approximately 50 per cent of the episodes over a 20-year period of the "prime of life," and another 25 per cent of the members have experienced fewer than 10 per cent of

the episodes.^{1, 2} Those experiencing the greater number of episodes were found to have a greater number of disease syndromes, major as well as minor, involving a greater number of organ systems, and falling into a greater number of etiological categories—in short, they appeared to have a greater "general susceptibility to illness" than other members of the group.

The number of episodes of illness experienced per unit time, therefore, is a rough measure of susceptibility to illness. For people in relatively static life situations it has provided a better basis for predicting future health than has the amount of time a person has been disabled, or, in most instances, the type of illness he has experienced in the past. Provided one uses an arbitrary but standardized definition of the term "episode of illness," it becomes a reproducible measure of "general health" which, though crude, has advantages over other measures so far tested in studies of this type.³

Differences in general susceptibility to illness are present early in life, and they appear to be at least in part "constitutional." The illness record of an individual, when followed over a period of years, fluctuates around a mean.¹ The various fluc-

From The Study Program in Human Health and the Ecology of Man, Departments of Medicine and Psychiatry, New York Hospital-Cornell Medical Center, New York City.

Presented at the Annual Meeting of the American Psychosomatic Society, May 4, 1957, Atlantic City.

Those who collaborated in these studies include Bry Benjamin, M.D., Peter Richter, M.D., John W. Gitinger, M.A., Leo Goldberger, M.A., Hope Leichter, M.A., and Ruth Pinsky, M.A.

Supported by a grant from The Society for the Investigation of Human Ecology.

Received for publication January 21, 1958.

PSYCHOSOMATIC MEDICINE

tuations are closely related to reactions to the various life situations that are encountered; but the mean level appears to be determined to a large extent by characteristics of the individual himself. Some people exhibit recurrent disturbances of mood, thought, behavior, and bodily function in an environment that the observer evaluates as relatively unchallenging, while others show little or no symptomatic response to major environmental changes. These differences from person to person could arise from differences in the perception and evaluation of the environment, or from innate differences in reactivity, or both.

It is the purpose of this paper to explore some of the characteristics of 10 people who have experienced a large number of illness episodes, and to compare them with 10 similar people who have experienced few illness episodes, in order to illuminate some factors that may be responsible for differences in general susceptibility to illness.

Method

At the time that this report was prepared, the distribution of illness had been studied in five groups of people: 1527 skilled workmen in New York City,¹ 1297 semiskilled women workers in the same city,⁴ 100 Chinese graduate students, technical, and professional people; 70 refugees from the 1956 revolution in Hungary; and 182 recent graduates of American colleges.⁵ The present report is based on the study of the Chinese, a group selected because of the large amount of dislocation and social change which they had experienced.

The members of the group had these features in common: (1) They were ethnically Chinese. (2) They were reared in China, in the Chinese cultural milieu. (3) During the course of their lives they had been exposed to the effects of the rapid changes in Chinese culture, the social upheavals and the geographic dislocations, which have characterized the last half-century in China, and many of them had had personal experience with wars, revolutions, new customs, and technological changes in their

homeland. (4) They had received (or were in the process of receiving) a modern, Western college education, and thus had had to make a personal adaptation to features of two dissimilar cultures. (5) With few exceptions they had come to the United States before 1949, in the pursuit of their education or their professional activities, and had been unable or unwilling to return to China after the Communists seized power. (6) In the United States most of them had been in a situation of uncertainty since that time, without assurance of their future status, their occupation, their careers, or the fate of their families, friends, and possessions in China. They were, therefore, a group who had experienced many major changes in their life situations, and who had had to make many major adaptations during their lives.

When this study was initiated in the fall of 1954, there were several thousand such Chinese in the United States. The 100 selected for study were obtained largely through the mediation of a Chinese educator on the staff of the project, who undertook to obtain a representative group covering the various professions, and the technical and the administrative fields. Altogether, his selections covered some 25 fields, ranging from medicine and art to engineering and business administration, and including a few housewives and some undergraduate students. In age, the informants ranged from 19 to 72, but the bulk of them were in their 30s or late 20s. Thirty-one were women, and 69 were men. Health was not a consideration in their selection. The project was presented to them as an attempt to understand the personality features and the problems of adjustment of their group of Chinese. Informants were selected for participation and then were asked to volunteer. Most of those approached agreed to be seen, and it is likely that the majority of those who refused did so because they were employed full time, and could not spare the two days necessary to complete the investigation of each person. Those who volunteered were motivated primarily by

a desire to contribute to the study, which covered points of great concern to all of them; their participation was also a personal favor to the highly respected staff member who obtained them for the project. Each informant received the sum of \$25 to help cover the expense and effort expended.

Sixteen hours were spent in the study of each informant. Four hours were spent with an internist, who obtained a factual biography, a comprehensive review of all illnesses past and present, a physical examination, and any laboratory tests necessary to clarify diagnostic questions. Four hours were spent with a psychiatrist, partly directed and partly in undirected interviewing aimed at obtaining an assessment of his personality features and some idea of the dynamics of the development of his personality. Four hours were spent with a clinical psychologist, who administered a series of tests, including the Rorschach, the Wechsler-Bellevue Form 1, the Sachs Sentence Completion, the Thurstone Temperament Scale, a projective questionnaire, the Lowenfeld Mosaic, and the Human Figure Drawing Test. Four hours were spent with a cultural anthropologist. In the latter part of the project two hours were spent with a sociologist. One of the goals of the anthropologist and sociologist was to place the informant in the context of his culture and his society, and to obtain an understanding of his culturally determined reactions to his various life situations.

The present report is primarily concerned with some of the medical and psychological observations. When the medical data had been obtained, illness episodes were tabulated by name, classified, and counted, using a prearranged, standardized, written procedure prepared for use in all of these studies. For the purposes of this report, only those illnesses which occurred during the twenty-year period from age 12 through age 31 were considered. Each individual was ranked according to the rate of episodes of illness per annum over this 20-year period, and individuals were selected for comparison on the basis of their

rank. The men and the women were treated as separate groups.

The psychiatrist and the cultural anthropologist could not escape learning about the health history of each informant during the course of their interviews, although they developed only a general idea of how each would rank on the final analysis of the medical data. Thus it cannot be stated that they evaluated the information in the total absence of knowledge of the health history of the informants; but they did attempt to exclude considerations of health from their evaluations. They made their decisions from analyses of their own data without knowledge of the results of the statistical analyses of the medical data.

Results

Distribution of Illness Episodes

Of the 69 men in the group, 60 were 32 years old or older, and had, therefore, health histories obtainable over a full 20-year period from age 12 through age 31. These 60 were a group large enough to be treated statistically. When the individuals within it were distributed according to the number of episodes experienced over the 20-year period, and the results were plotted by cumulative percentages of individuals, the resulting plot closely approximated the curve of a calculated negative binomial distribution. Such a distribution is in accordance with the assumption that some factor (or factors) in addition to chance operated in determining the distribution of episodes of illness or, in other words, that the likelihood of becoming ill varied from person to person (Fig. 1).¹

When the men were divided into quartiles based on episodes of illness per annum, the quartile whose members had the highest frequency of illness had 49.5 per cent of the episodes experienced by the entire group, and the quartile with the lowest frequency rate experienced only 8.5 per cent of the episodes (Fig. 2).

When the number of episodes of illness experienced by each man was plotted

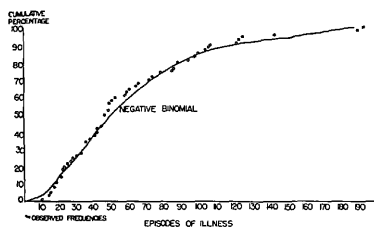


Fig. 1. Distribution of 60 Chinese men (age 12-32) by total number of episodes of illness.

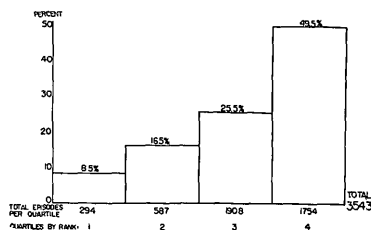


Fig. 2. Distribution of 60 Chinese men (age 12-32) by number of episodes of illness per annum.

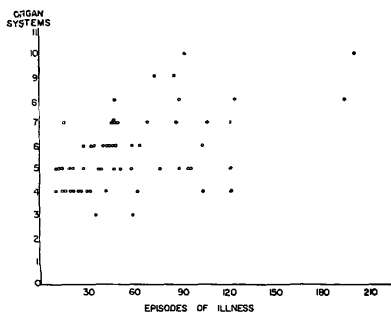


Fig. 3. Episodes of illness in 60 Chinese men (age 12-32) plotted against the number of organ systems primarily involved.

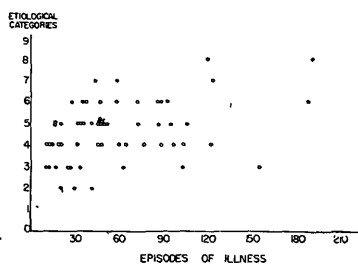


Fig. 4. Episodes of illness in 60 Chinese men (age 12-32) plotted against the etiological categories in which the illness fell.

against the number of organ systems primarily involved in these illnesses, the general upward trend of the data was apparent (Fig. 3). The plot closely approximated that obtained from similar data from the American groups.⁸ Considering that these data were obtained from memory, and that the recall of minor episodes of illness is relatively inaccurate even under the most careful questioning, there is a noteworthy similarity between these data and those obtained from the detailed and continuous health records of the American working groups.

The various illness syndromes were placed in "etiological categories" as defined by the *Standard Nomenclature of Diseases and Operations*,⁶ and the number of episodes experienced by each man was plotted against the number of "etiological cate-

gories" into which they fell. This plot also resembled that obtained from the data from the American groups, trending upward as the number of episodes increased (Fig. 4).

Among the 31 women there were 18 who were 32 years old or older, and who therefore provided data over the time span from age 12 through age 31. The number was too small to be treated statistically as a separate group. When the data from the women were combined with those from the men, and the grouped data were treated as a whole, the results previously described were not significantly altered; but such a procedure creates a mixed sample, which is not desirable, and for this reason, data from the women were excluded from the plots.

Among the 60 men, the number of sickness episodes per annum ranged from 0.5

to 9.6. Among the 18 women, they ranged from 0.6 to 20.2. The 7 men and the 3 women having the lowest rates were selected for comparison with the 7 men and 3 women having the highest rates. These two groups of informants are listed in Table 1. The rates per annum in the lowest frequency group ranged from 0.5 to 1.3, that in the highest group ranged from 5.3 to 20.2. Thus, the members of the high-frequency group had experienced approximately ten times as many episodes of symptomatic illness during adolescence and young adulthood as had the members of the low-frequency group.

Comment

Although it is recognized that data obtained from memory are not precise, it is reasonable to conclude that the difference between the two groups in respect to number of illness episodes per unit time was real, and of the order of magnitude stated. Their members were comparable in age, sex, and education, the interviews provided no evidence that they differed in their capacity to recall, in their willingness to talk, or in their use of repressive mechanisms, in a manner that would account for this difference in distribution of illness episodes. Their syn-

dromes described were clearly recognizable and their signs and symptoms often detectable by examination; and neither group had more reason to conceal its illness than the other. In the American groups, where records were available for comparison with medical histories, it was found that the recall of major episodes of illness is generally good, and that the recall of minor episodes is generally inaccurate in detail, but accurate in order of magnitude. For example, people who say that they had a severe headache about once a month for 20 years may have had many more or many fewer headaches than they actually describe, but they almost always have had a great many more headaches than have people who maintain that they have never had a headache at all.

The illness episode rates calculated for these Chinese are only an approximation of the facts, and should be so regarded. Rankings, and the rates for individual cases, are relative. However, there is no reason to doubt that there is a difference in the number of symptomatic episodes of illness experienced by the two groups as such, and the comparison between them is justifiable on this basis.

Family Histories

A review of the family histories of the members of the two groups revealed no striking differences in the general health or longevity of their kin, or in the incidence of familial diseases among them. In both groups there were some whose parents were healthy and long-lived, and others whose parents were chronically ill and died young.

Childhood Health

Eight members of the low-frequency group reported that they had been robust and healthy in infancy and childhood, and two said that they were thin and sickly during this time. One of the low-frequency group was enuretic to age 10. Seven of the high-frequency group reported that they had been healthy infants and children, and one of the seven said that he had been the healthiest child in his family, three reported that they had been sickly. Two of this group were enuretic to age 10.

TABLE 1. LOWEST AND HIGHEST FREQUENCY OF ILLNESS EPISODES PER ANNUM

INF	AGE	ILLNESS PERIODS RATE PER ANNUM	OCCUPATION
LOW-FREQUENCY			
L1	37	0.5	INSURANCE BROKER
L2	72	0.6	WIDOWED EXECUTIVE
L3	37	0.65	CHEMICAL ENGINEER
L4	34	0.7	GRADUATE STUDENT
L5	37	0.75	GRADUATE STUDENT
L6	32	0.75	HOUSEWIFE, MOTHER
L7	32	0.8	WHITE COLLAR WORKER
L8	44	0.85	COLLEGE INSTRUCTOR
L9	33	0.85	DEPARTMENT STORE MANAGER
L10	37	1.3	RECENT BRIDE
HIGH-FREQUENCY			
H10	31	5.3	CHEMICAL ENGINEER
H9	31	6.0	CERTIFIED PUBLIC ACCOUNTANT
H8	33	6.1	GRADUATE STUDENT
H7	32	6.2	GRADUATE STUDENT
H6	32	7.1	PHILOSOPHY LECTURER
H5	36	9.9	SURGICAL RESIDENT
H4	33	9.6	GRADUATE STUDENT
H3	33	13.6	SECRETARY
H2	37	15.0	COLLEGE INSTRUCTOR
H1	30	20.2	HOUSEWIFE, MOTHER

Illness Experienced During the Period of Observation

The high-frequency group, during the 20-year period from age 12 through age 31, experienced 14 major illnesses (mean per person 1.4, range 0-4), 20 disorders of mood, thought, and behavior (mean per person 2.0, range 0-6), and 1989 minor episodes of illness (mean per person 199, range 108-342). The number of organ systems primarily involved in illness averaged 7.7 per person (range 5-9). Their health histories may be briefly characterized in the following summaries:

H 1. A woman with recurrent attacks of migraine and severe dysmenorrhea, who also had malaria, preeclampsia, and a major depressive illness, as well as recurrent upper and lower gastrointestinal disturbances, anemia, hemorrhoids, and moderately frequent upper respiratory infections.

H 2. A woman with recurrent bouts of low-grade arthritis, who also had malaria, dysmenorrhea, recurring lower-bowel symptoms, and intermittent respiratory infections, as well as myopia, exfoliative dermatitis, hemorrhoids, and extensive dental caries.

H 3. A woman with recurring episodes of gastric hyperfunction, but without a demonstrable ulcer; she also had hyperthyroidism, acute appendicitis, the Stevens-Johnson syndrome, a spontaneous abortion, many vascular headaches, and recurrent symptoms of tension and anxiety, plus fairly frequent upper respiratory infections.

H 4. A man highly susceptible to respiratory infections, who also had chronic bronchitis, allergic rhinitis, and sinusitis, as well as recurrent vascular headaches, constipation, fissure in ano, myopia, a chalazion, and symptoms of muscle tension and anxiety.

H 5. A man with the "irritable colon syndrome" and migraine, who also had malaria, typhoid, dengue, and appendicitis, as well as trachoma, frequent respiratory infections, severe dental caries, myopia, hemorrhoids, acne, acute epididymitis, and a number of accidents.

H 6. A man with severe migraine, who also had malaria, and a depressive illness.

H 7. A man highly susceptible to respiratory infections, who also had vasomotor rhinitis, recurrent otitis media, malaria, and episodes of

anxiety and depression, as well as myopia and severe dental caries.

H 8. A man with recurrent respiratory infections, who also had vascular headaches and gastric hyperfunction, as well as vasomotor rhinitis, malaria, depressive and neurasthenic symptoms, and nonspecific arthritis.

H 9. A man susceptible to respiratory infections and sore throat, who also had typhoid, gastric hyperfunction, and a great deal of dental caries, as well as myopia, allergic rhinitis, chronic sinusitis, and an accident.

H 10. A man with gastric hyperfunction, tension headaches, and fairly frequent respiratory infections, who also had infectious hepatitis, mumps, dental caries, and a few anxiety symptoms.

The low-frequency group, from age 12 through age 31, experienced 11 major illnesses (mean per person 1.1, range 0-2), 11 disorders of mood, thought, and behavior (mean per person 1.1, range 0-2), and 123 minor episodes of illness (mean per person 12.3, range 3-21). The number of organ systems primarily involved in illness averaged 4.3 per person (range 3-7). Their health histories are briefly characterized:

L 1. A man who on most careful questioning could recall only two symptomatic illnesses during the 20-year period, a brief febrile illness, probably infectious, at age 22, and a sprained wrist at age 15. He denied all other symptoms during this time, and stated that he had always felt healthy. The only finding on examination was myopia.

L 2. A woman who had a behavior disturbance at age 12, in a setting of family conflict, and whose only other illnesses were mild respiratory infections occurring approximately every two years.

L 3. A man whose recalled illnesses were four episodes of dental caries, two respiratory infections, cholera, a contusion of the arm, and a two-day febrile illness of unknown etiology.

L 4. A man whose recalled illnesses were appendicitis, the fracture of two teeth, ten upper respiratory infections (estimated), and a few days of anxiety and depression when his wife obtained a legal separation.

L 5. A man who during the war had beriberi and two severe bouts of malaria, but, except for these, denied all illnesses and symptoms other than a few respiratory infections, a dog bite,

and a few days of impotence and premature ejaculation shortly after his wedding.

L 6. A woman who had a tonsillectomy at age 12 at her parents' insistence, had had a few respiratory infections thereafter, and had been well otherwise, except for one episode of fainting, one of bleeding, and two of anorexia and nausea during her four pregnancies.

L 7. A man who had acne, two bouts of malaria, a mild episode of bacillary dysentery, a short period of dejection after the death of a sister, and who insisted that he had had only two upper respiratory infections during this period.

L 8. A man who stated that he had been well except for two brief periods of loneliness and slight depression, about ten respiratory infections, malaria, staphylococcal septicemia, and a pilonidal cyst.

L 9. A man who was well except for malaria, a minor patch of psoriasis, and about ten respiratory infections, despite the fact that he had a noticeable congenital deformity, and said that he had been shy, discouraged, and resentful about this all of his life.

L 10. A woman who was ill for six months because of minimal tuberculosis, which did not recur, but who otherwise had only about 15 respiratory infections, mumps, myopia, and two short periods of moderate anxiety and tension.

Life Experiences

During their lives, the members of both groups had faced many difficulties including problems of interpersonal relations, the attainment of a modern education, geographic changes, shifts in their social and cultural milieu, the hazards of war and similar threats and deprivations, and a variety of individual responsibilities and frustrations. There is no adequate way of counting or measuring these, but they can be epitomized briefly for each informant, beginning with the high-frequency group:

H 1. The child of a concubine of a high government official, she was given away at birth to be reared by a foster mother until age three. Returned to her family, she had a barren existence until her invalid mother died when she was nine. After three more years with the foster mother, she was sent to a village at age 12, to escape the Japanese war. She had six months of hardship there, and then went to

Chungking and Chengtu, obtaining a modern college education under difficulties in the midst of war. At 22, she married a religious scholar and businessman, went to an East Asian country with him, and taught school there until his business collapsed. She then came to the United States, where she worked variously in grocery stores and laundries in order to support her husband, parents, and two children. Recently she had been living precariously on her husband's small fellowship while he resumed his studies of Oriental religion.

H 2. The first of seven children of the sickly wife of a Chinese who had become a poor Protestant parson. She was sent to mission schools in Treaty Ports. At the onset of the Japanese war, she was separated from her family and evacuated with other adolescents to rural China, then went across country to southwest China, enduring many privations and bombings while obtaining a modern education. After her graduation she became a teacher by necessity. She came to the United States for advanced training in the late 1940s, and was unable to return. She had held various mediocre teaching jobs in small colleges in the United States since that time, and was still unmarried.

H 3. The only child of a self-made Army officer who married a scholar's daughter and became an important military leader. Her parents took her all over China in the 1920s, with many nurses and servants and no playmates. Her mother was a chronically depressed woman. At the age of 10 she was sent to mission school, and attended six different schools in as many years, accompanied by her ill mother; she finally graduated from college at age 23. A year later a marriage was "arranged," and at a large and fashionable wedding she was married to a Chinese businessman, who was unfaithful and squandered her money. After having one child she divorced him at age 26 and went to Taiwan, where she got a government job. Transferred to the United States several years ago, she brought with her her mother and her daughter, whom she supports.

H 4. Born in Canton, the son of an American-born Chinese businessman who went to China to have a family. The father returned to the United States when *H 4* was several months old, and did not come back. *H 4* was reared happily up to age 13 in a large family compound with many children, and attended Chinese schools. At 13 he went to a modern

middle school. During the war he escaped across country to Chungking and went to college there, with some difficulty and privation. At age 26 he went to Singapore to learn English, and a year later he became a journalist. In the late 1940s he came to the United States to study and was supported on a grant, when his funds were cut off. He later married a Chinese girl with a good job, who helped to support their mutual household.

H 5. Born in Hong Kong, the son of a Chinese educator. He attended a Chinese school to age 10; then, after some rebellion, he went to modern Roman Catholic mission schools. During the war he was sent to a Catholic college in a coastal city, and after one year there he was persuaded to shift from engineering to medicine. He graduated at 26, and had an internship and residency in Chinese hospitals. In the late 1940s he came to the United States for further training, and he had remained here since in the status of a "permanent surgical resident," being unwilling to return to China, and unable to practice here because he is an alien.

H 6. The eldest son of a Chinese scholar, he was reared in comfort and with solicitude in a traditional, well-to-do, large family compound. Educated by tutors, and then sent to a modern university, from which he graduated at age 22. His parents having died, he took over the leadership of the large family, marrying a "cousin" by arrangement. Friction soon developed between them and the marriage was never satisfactory. He held a number of teaching positions in China until he came to the United States before the war for further study, leaving his family behind. Moving in a leisurely fashion from university to university, he finally obtained his degree eight years later. In the 11 years since, he had lived on lecture fees and meager grants from foundations, occasionally teaching. He had not attempted to return to China, and had found no solution to his marital situation.

H 7. The eldest son of a rural landowner who became a politician. His parents were solicitous and affectionate, but his family moved around a great deal during the political upheavals of the 1920s. He was separated from them and sent to boarding school at age 13, and was evacuated to southwest China with other students at age 15. He was leader of his student group, and, in Chungking, while obtaining an education under difficulties, he remained a leader and became active in politics. He com-

pleted his studies after the war in a large Chinese university, standing first in his class. He then went to Europe to study political science, coming to the United States the next year. He completed his doctorate three years later. Since then he has worked at various incidental jobs in order to support himself, and has done some teaching. He has been unwilling to return to China, and has not established a career or marriage here.

H 8. The third son of an uneducated but well-to-do restaurant owner in Canton, he was raised by a nursemaid while his parents traveled. They were away from home most of the time until he was seven, when he was sent to a mission school. He attended this and another school until age 14, when his father took him to another area in China to escape the war. There he attended an English religious school for two years, until he was expelled for taking part in a riot. He traveled overland to west China, where he continued his education, while suffering serious privations. He was briefly in the Chinese Army. After the war he continued his studies, graduating at 26. Forced to flee from the Communists, he came to the United States and studied for a higher degree at several midwestern universities until his funds were cut off. After that he worked at various incidental jobs to support himself.

H 9. The youngest son of a well-to-do publisher, his childhood was spent in a comfortable home, with affectionate parents, good sibling relations, and solicitous servants. He went to a Chinese private school to age 12, when his family fled to the French Concession in Shanghai to escape the Japanese. He was sent to a British-type middle school and college, remaining in the same city throughout the war. After his graduation, he took a job in a bank. Shortly after the war he came to the United States, and in two years obtained a Master's degree from an important university. Finding that this did not help him to obtain a job, he took a second Master's degree in another field and since then has worked successfully for an important corporation. A few years ago he married a Chinese girl of similar background. They have one child, are satisfied with the marriage, and have a comfortable home.

H 10. The thirteenth child of a well-to-do bank manager who had a modern education, but ran his household as an old-fashioned large family. The home was stable, and interpersonal relations were good. He was cared for

by an amah to age 10. His mother was kidnapped that year, but returned unharmed. From age 11 to 13, he was taught at home by tutors, thereafter, he attended a modern middle school, and later went to college, remaining in Shanghai during the war. In the mid-1940s he came to the United States to join an older brother and obtain further education. He tried several schools and considered several courses of study before deciding to become an engineer. Cut off from funds a few years later, he soon obtained a well-paid job as an engineer in the United States, and shortly thereafter married a Chinese girl of similar background. He lives in a comfortable apartment with his wife and mother-in-law.

The same information for the "low frequency" group may be epitomized thus:

L 1. The second son of a wealthy businessman, he grew up in a large, semimodern household, with many children, who were cared for much of the time by servants because the parents were away from the home. He had private tutors in childhood, and was then sent away to a Protestant boarding school. During the war his father sent him in comfort and with ample funds to join his brother in Chungking, where he obtained a college education while carrying out successful business ventures on the side. Graduating in political science at age 24, he obtained a job in a government agency, and the next year married a well-to-do girl of his own choice. After the war he obtained a post with the government, and in the next two years he and his wife had two children. He was sent overseas, and shortly thereafter was left without a job or funds when the government was defeated. Moving to the United States on his own resources, he took a course in business, established his own firm, and has prospered. He has a substantial house with servants in a suburb of a large city.

L 2. Born before the fall of the Empire, the bound-foot daughter of an old Chinese family, she was reared in the Confucian tradition until she rebelled at age 13 and demanded a modern education. With great effort she learned English at a mission school, soon excelling in this and other studies. Gradually she broke away entirely from the traditional restrictions upon women, becoming a Christian, participating in political activity, becoming a respected executive, and ultimately marrying a man of her own choice, while overcoming the vigorous opposi-

tion of her family and the strong sanctions of her friends in order to do so. When her husband died tragically shortly after the marriage, she resumed her career and raised and educated her children through the difficult period of the Japanese occupation. She left China with great reluctance in the late 1940s and has established a comfortable home for herself and her two daughters in the United States.

L 3. The third son of a banker, he was reared in a harmonious large family setting, with many children and servants, who continued with him through the private school and the private middle school which he attended. His family remained in Shanghai during the Japanese war, in comfort, and he went to college there, studying engineering. Upon his graduation at 22, he worked for six months in a factory, and then went to Hong Kong. He went through the siege of Hong Kong in 1941, escaped across country to Chungking with some hardship and privation, and lived and worked there throughout the war. Shortly after the war he came to the United States to complete his studies. Entering a top-grade engineering school, he obtained a creditable record. At 30 he married a Chinese girl of similar background. After their funds were cut off in 1949, he obtained a job as an engineer with a Chinese concern, and did well financially. His wife continued her education intermittently, while rearing their two children. He bought a home in the suburbs of a large American city, and continued to prosper, as did the members of his family.

L 4. The son of a village landowner who became a Christian because his opium-smoking uncles were squandering the family inheritance. There was some conflict in the family because of this. *L 4* was the first child in the village to go to a modern school, to high school, and then to college. For four months, early in the war, he fought against the Japanese as a soldier; then he walked on foot over a thousand miles to Chungking, where he attended school, took part in student activities, and partly supported himself. At age 24 he became the principal of a Christian high school, and rose rapidly in the field of education. At 27 he became dean of students at a large university, and made a marriage of choice to a girl of similar background, with whom he was very happy. Coming to the United States to continue his studies, he was forced to leave his wife behind. Shortly thereafter the Communists took over the government and his funds were cut off. Soon he

lost contact with his family; a few years later he was notified by mail that his wife had received a "political divorce." During the course of these events he continued his studies, obtained his degree, and found a job in the United States in his chosen field, where he continued to work steadily and productively thereafter.

L 5. The fifth child of a wealthy rural landowner. His father died when he was two years old, and his mother took the large family to a nearby town, where the children could get a modern education. He attended various Chinese schools near his home. During the war he went to western China to a displaced university, where he completed his education with a good deal of hardship and privation. After a brief period of postgraduate work, he volunteered for youth work with the Army, which he continued until the end of the war, when he returned to his native village and married a girl chosen by his family. The girl wanted the marriage, but he was unenthusiastic about it. It has worked out very satisfactorily. He became the protégé and assistant of a prominent Nationalist general, and accompanied this general to Taiwan, taking his family with him. He had moved steadily ahead as an administrator there. He came to the United States to do postgraduate work, and was seen during his brief visit here.

L 6. The ninth of ten children of a wealthy politician. She grew up in a large, old-fashioned family with an uneducated mother and many servants, having no very close associations in childhood. At age 9 she was sent to boarding school with a maid. Thereafter she was in a succession of schools, being at home only on vacations. She was sent to Chungking when the Sino-Japanese war broke out, and completed her education there in semicomfort, with the maid still in attendance. At age 19 she made a marriage of choice to a wealthy "playboy," and lived with him and his parents until the end of the war. She then accompanied him to the United States, where he soon established himself as an able and responsible businessman, and prospered. He has taken over the support of those members of both families who lost their income after the Communist revolution. She had four children, a comfortable home, and was pursuing the career of housewife.

L 7. The only son of a self-made military man who became a successful Nationalist officer. He was sent with his mother to live with the grandparents in a rural village at age three,

and from then to age 10 he was reared in a traditional setting. He then rejoined his father, and was sent to modern schools and middle school, during the war he continued his education at Chungking with great difficulty, suffering many bombings and much privation. Later in the war he accompanied his father to Europe and attended a European medical school for three and a half years. In the late 1940s his father returned to China, leaving him in the United States. Failing to get into an American medical school, he made no further attempt to obtain an education, but settled down and lived on his remaining money until this gave out, making only nominal attempts to continue his medical education. After his last few thousand dollars had been stolen, he moved to another city and obtained a full-time job in another field, which he found dull, but which he continued out of necessity.

L 8. The seventh of eight children of a convert to Protestantism, who worked for the church. His father had tuberculosis, and turned him over to a stern, cold, rejecting uncle and aunt for adoption. He had a barren, deprived, and restricted childhood. He was sent to mission schools, where he did poorly, and to a Christian college, which he left two years later after failing two subjects. Marrying a wife of his choice, whom he found compatible, he became a technician, and moved west to work in a large industrial plant when the Sino-Japanese war began. A sister, married to a wealthy and influential man, made it possible for him to come to the United States after the war. Here he enjoyed going to a number of colleges over the course of a decade, starting as a premedical student, shifting to physics, and finally to engineering, in which he ultimately received a degree. Thereafter he obtained a job as a teacher of engineering, bought a house, and lived comfortably with his wife. He had no children.

L 9. The third son of a well-to-do judge, he had a prominent congenital deformity. His early years were spent in a large and quarrelsome family, then he was sent to Chinese public schools, where he was a poor student, and was teased and ridiculed. During the war he went to school in Shanghai and later in Chungking, but did little and followed no regular academic course. His marriage was arranged by his mother, and after it, he lived with his wife's parents. With money supplied by his father-in-law, he and his wife came to the United

States after the war, leaving their two children behind. He briefly attended a junior college on the West Coast, intermittently studied art, then worked in a factory and a retail store. A third child was born before his wife left him. Thereafter he moved to a new city, taking this child with him, and obtained a job as a stockboy in a department store, which he had held since.

L 10. The only daughter of a government official, she was a thin, sickly child and a feeding problem during the first 18 months of her life. Thereafter her childhood was healthy. She went to various mission schools, and traveled about to various cities with her parents. She stayed with them in Hong Kong until the Japanese occupation of that city, then escaped to Chungking, where she went to boarding school and her family soon joined her. Still with her family, she returned to Shanghai after the war and resumed her college career. Her first separation from them occurred when she was sent to the United States in the late 1940s for further schooling, but they came over and rejoined her after her graduation. Thereafter she worked for a while in a department store, while continuing to live with her parents. Her father died, and her brother caused some difficulties during this time. She was engaged to a young Chinese when she was seen.

The Realization of Potentialities

There appeared to be a difference, but not a great difference, between the members of the two groups in the degree to which they had realized their apparent potentialities, and had fulfilled the responsibilities of their position in life, as these were estimated by the project staff.

In these respects the high-frequency group were characterized thus by the staff:

H 1 was a woman who had striven conscientiously to fulfill the role of a faithful daughter and wife, as she understood it.

H 2 was an inflexible old maid, rigidly pursuing a career in which she could expect neither success nor reward.

H 3 was a woman whose family had made poor choices for her, but who tried conscientiously to fulfill her responsibilities nevertheless.

H 4 was a striving, ambitious man, who had got ahead partly by his own effort, but had not

succeeded as much as he wished.

H 5 had acquired good surgical training in spite of many difficulties; but he had not solved many other problems in his life.

H 6 was a passive man who had not discharged his family responsibilities, solved his marital problems, or worked out a career suitable to his present life situation.

H 7 was a striving and ambitious man, with a record of leadership and achievement, who was caught in a situation for which he could find no solution.

H 8 was a man whose early life experiences had not prepared him for a life of hardship and decision, and who had had difficulty in dealing with these.

H 9 was a striving, ambitious, and able man, who had made a good adaptation to his present situation.

H 10 was a likable and conscientious man, who had had more responsibility thrust upon him than he would have sought of his own accord, and had tried to meet it adequately.

The members of the low-frequency group were epitomized thus by the staff:

L 1 was a likable man, generally looked upon as resourceful and successful, but primarily interested in taking care of himself.

L 2 was a woman deeply convinced that her course in life was proper and justifiable, quite adept at attaining her goals, and highly respected.

L 3 was an able man, who became a good engineer, and made a good adaptation to American life.

L 4 was a man deeply convinced that his course in life was proper and justifiable, and successful in following his own career in the United States.

L 5 was a man without fixed goals, who had taken advantage of his opportunities, and had done well for himself.

L 6 was a girl who had faced rather few responsibilities, had made few decisions, and was fortunate to have had an easy life.

L 7 was a man who had moved ahead as long as opportunities were present, but had made no serious effort to solve the first major problem in his life.

L 8 was a man who had rejected his first opportunities and, more by luck than by design, had ultimately found a life situation that was satisfactory for him.

L 9 was a man with a modest intelligence, who had not made very much of his life, and

had not attempted to do so. His family and his friends regarded him as a conspicuous failure.

L 10 was an immature young woman who had had a relatively easy life under the protection of her family, and was only beginning to encounter the problems of adult independence.

Perceptions of Life Experiences

On the other hand, there was a notable difference in the way that the members of the two groups had viewed their own lives.

The perceptions of the high-frequency group may be epitomized thus:

H 1 saw herself as an unloved and unwanted child, who had had a lonely and difficult life, and now had a husband and children who were a burden to her.

H 2 saw herself as a restricted and deprived child, who had had a lifetime of hardship and responsibility, and a career that was not really satisfying. She would have liked to be married, but she could not find a man who came up to her standards, and in any case, she found it difficult to let herself go emotionally.

H 3 saw herself as a lonely child, with an ill and unhappy mother who had always been a burden to her; she regarded her marriage as a tragic mistake, and her present lot in life as extremely difficult.

H 4 was a suspicious and resentful man, who saw his life as full of obstacles, many of which were created by other people.

H 5 saw himself as the child of an unhappy mother and a demanding father, who had been persuaded to go into a profession that was extremely difficult, and now found himself in a demanding, unsatisfactory, and insolubly difficult life situation.

H 6 saw himself as a man who had been trained as a scholar, but who had not received from his parents, his wife, or his associates the affection, the support, or the status, which a Chinese scholar should receive.

H 7 saw himself as a man of special abilities, with a promising future in Chinese politics, who had accepted unusual responsibilities and challenges, and had been repeatedly frustrated by misfortune.

H 8 saw himself as having been reared by a very strict father, and a demanding older brother. He had wanted to be a musician, but felt it to be his duty to work at an uninteresting

career, and to take on many onerous responsibilities.

H 9 saw himself as a serious, responsible person, whose early life had been easy, but who had had to struggle hard ever since then in order to attain his present position.

H 10 saw himself as a person without any special demands or ambitions, who had had a happy childhood, and had tried to do whatever was necessary thereafter, even though some of it had been hard.

The perceptions of the low-frequency group may be epitomized thus:

L 1 saw himself as a man who had had an easy life, involving a number of changes, none of which had been as great as he had thought they might be, and each of which had led to a new and interesting experience.

L 2 did not question the correctness of any of the major decisions she had made and saw herself as destined to overcome any obstacle she might encounter; she took it for granted that she would hold positions of leadership and responsibility. She looked back upon her life with satisfaction.

L 3 saw his childhood as happy and secure, his schooling as enjoyable, and his life as full of interesting experiences and unexpected opportunities.

L 4 saw himself as a man who had a fortunate childhood, and whose father had provided him with a reliable guide to the course of conduct that he should follow under any circumstances; his life had been full of change and adventure, and some hardship, but he had no doubts and no conflict about any of his decisions.

L 5 saw his childhood as secure, and his later life as interesting and full of opportunity; he regarded his wartime experiences as interesting, though hard, and looked upon his marriage as a move which had turned out well.

L 6 saw herself as a "lucky person"; she regarded herself as a good mother and a good wife, who was happily married, had had a "nice time" in childhood, and had never experienced any real hardship.

L 7 saw himself as a person who had had a rather secure and pleasant childhood, who had studied medicine because he had liked it, and who had had to quit through no fault of his own; he regarded his wartime experiences as physically hard, but not otherwise difficult, and saw his present situation as not of his own

making; he expected that something would turn up after a while.

L 8 saw himself as a man who had been treated unfairly and deprived of his just due in childhood, who had had to fight for his rights, and had gradually begun to attain them.

L 9 had always been angry, ashamed, and somewhat discouraged about his deformity, he saw himself as a man who wanted to be jolly and well-liked, and become an artist, he had no interest in higher education, regarded his wife with indifference, rather enjoyed his work as a salesman, and enjoyed the companionship of his young son. He looked upon his experiences in the United States as the best part of his life.

L 10 saw herself as a person who was very close to her family, and had spent her life in the midst of them; life had been pleasant and not at all difficult until she came to the United States and went to school and was separated from them. Recently her father's death and the difficulties with her brother had upset her, but she expected that things would be better as soon as she was married.

Summary of Data

The observations and conclusions drawn from the study of the life histories of these two groups of people, described in the foregoing paragraphs, may be summarized thus:

1. The lifetime environments and the various life experiences of the members of the two groups did not appear to be significantly different, as viewed by an outside observer.

2. On the basis of estimates of trained observers one could not establish a significant difference between the two groups with regard to the degree to which members had realized their potentialities and had fulfilled the responsibilities of their positions in life. If anything, the data suggested that some of the more frequently ill were superior in these respects.

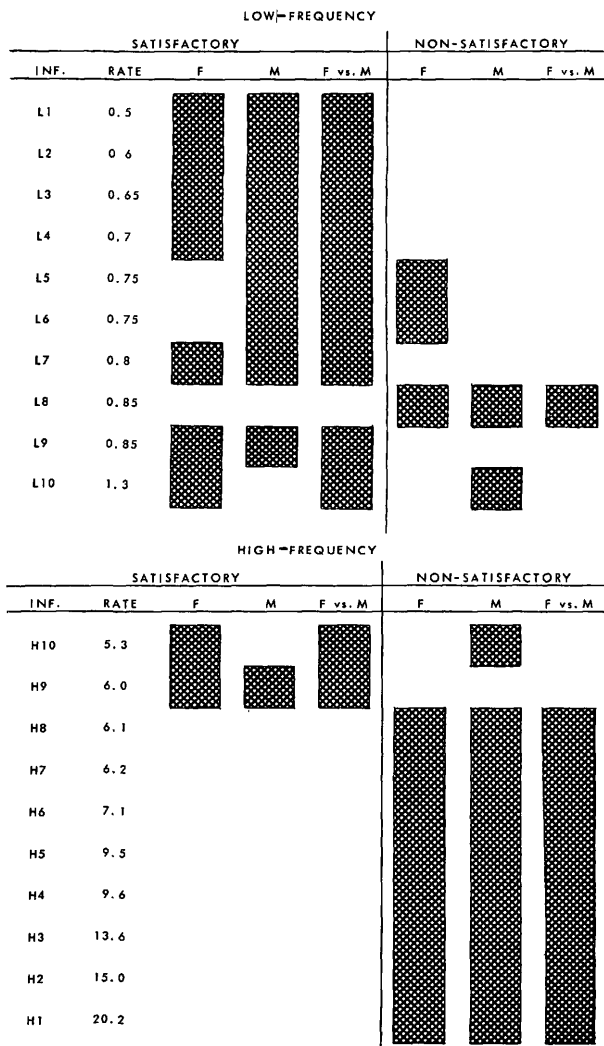
3. The members of the two groups were notably different in the way in which they had perceived their lives and the various situations that they had encountered.

It was the judgment of the staff that the members of the high-episode group were more predictably oriented toward an identification with goals in which their own self interest was not of paramount importance, and with duties, responsibilities, and ideol-

ogies, and they showed more concern about, and reaction to, the events and situations which they encountered than did the members of the "low frequency" group. It was generally agreed that some of the low-frequency group had shown an unusual lack of concern when confronted by situations which the external observer would have expected to cause them the greatest concern. They were more concerned with fulfilling those social expectations which advanced their own interests.

When those who make such judgments have prior knowledge of the classification of those judged, their own bias is liable to enter into their decisions. An attempt was made to escape this by submitting the 20 cases to the psychiatrist, without informing him of their ranking and without indicating their grouping. He was asked only whether he could divide these informants into two groups of ten upon any basis, using the psychiatric data alone. In his opinion they were so divisible, 10 of them having perceived their childhood environment, their relationships with their parents, and the relationship between their parents as generally satisfactory, and 10 having perceived these relationships as generally unsatisfactory. When the groupings of the psychiatrist were compared with the ranking of the informants made on the basis of episodes of illness, it was found that 8 of the 10 who saw their childhood environment as "satisfactory" fell into the low-frequency group, and that 8 of the 10 who saw their childhood environment as "unsatisfactory" fell into the high-frequency group. It is improbable that this is a coincidence due to chance alone ($\chi^2 = 7.2$, $p = < 0.01$) (Figs. 5 and 6).

The independent analysis of the psychological tests indicated personality differences between the two groups¹⁸ (Fig. 7). Seven members of the low-frequency group were described as people who "experienced little conflict or anxiety arising out of interpersonal relations. They showed little insight into themselves, or awareness of emotional problems. In general, they ap-



Figs. 5 and 6. Psychiatrist's independent evaluation of each informant's perception of his relation with both parents and the relationship of the parents between themselves. *F*, father; *M*, mother; *F vs. M*, relationship between father and mother.

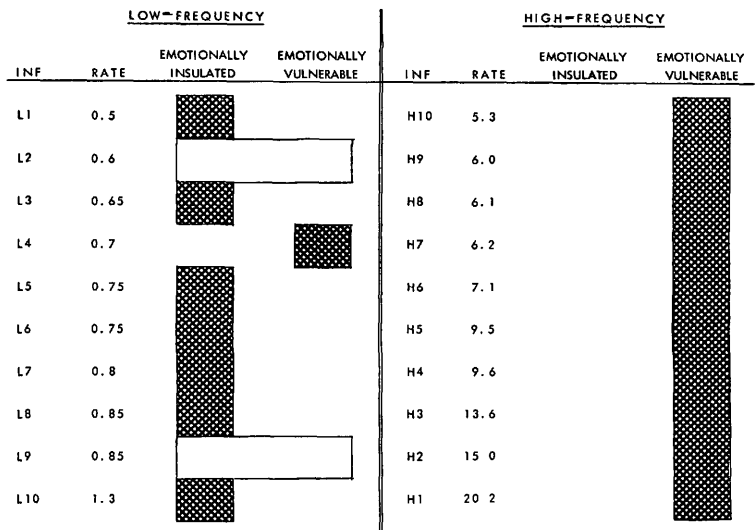


Fig. 7. Summary of the independent integration of data from all psychological tests for both low-frequency and high-frequency groups. Crosshatching indicates overall patterns. See text for explanation of these categories. The open boxes under the low-frequency group indicate test results not falling clearly into either of these two categories.

peared self-centered, morally righteous, insensitive to the needs of others, and rigidly insulated from close interpersonal involvements. However, they were skillful as role players in highly structured situations where demands and expectations were clearly understood and ritualized. Their defense pattern emphasized the use of denial, reaction formation, intellectualization and rationalization."

All of the informants in the high-frequency group presented psychological test patterns interpreted as showing "anxiety, tenuous contact with reality, and a pattern of restriction in many important areas of functioning. This pattern of restriction was not a successfully integrated one, and these informants experienced a great deal of tension as a result of their inability to gratify many of their most pressing needs." They readily discussed emotional and interpersonal problems, partly because of the

intensity with which they experienced such problems and their awareness of them. They were more inner-directed, more self-absorbed, and more preoccupied with their difficulties in dealing with other people.

One of the low-frequency group was said to show a pattern similar to those evidenced by the members of the high-frequency group. Two others fell into neither of these categories.

Assessment of the social data allowed less clear-cut conclusions, but directions were apparent. The members of the low-frequency group in general came from more stable families, that were capable of lending more support to their members and had a far lower proportion of polygamous marriages—which had become a source of difficulty among the segment of society from which these Chinese originated. There were more complete families in the group also. More of the members of the low-fre-

quency group also had occupied a preferred sibling position, and had had a positive experience in their schooling, marriages, and careers.

Discussion

Like their American counterparts, these Chinese exhibited differences in susceptibility to illness, which were general as well as specific. Those who had experienced the greater number of sickness episodes per unit time had had more syndromes, involving more organ systems, and falling into a greater number of etiological categories. Biologically they behaved as if they were more easily displaced from an ideal state of "health" by a variety of means, and in a variety of directions.

The family histories of the members of the two groups were not notably different with regard to the illness or longevity of the family members. This fact is not of great help in deciding the part that genetic factors may play in such differences in susceptibility, because from a genetic point of view these family histories are very limited and of poor reliability. This is not to say that the informants were themselves unreliable, but simply that they did not possess the pertinent information. That genetic determinants may be of great importance, however, is strongly suggested by the known familial occurrence of many of the syndromes experienced by the members of the high frequency group, such as migraine,⁷ myopia,⁸ allergic rhinitis,⁹ and recurrent depressive illnesses.¹⁰

It is hard to find convincing evidence that the external aspects of the lifetime experiences of the members of the two groups were significantly different. Physical hardship, geographic dislocation, social change, and interpersonal difficulties occurred with approximately equal frequency in both groups. Many of those who had few episodes of illness had had an abundant exposure to demanding life experiences. One can only conclude that physical hardship, geographic dislocation, social change, and interpersonal difficulties, even when experi-

enced in large amounts and over long periods of time, did not inevitably cause these Chinese to become ill. The same thing can be said of the members of the two American groups that were studied; difficult and demanding life situations were not inevitably associated with the occurrence of illness among members of these groups also.

Yet, on the other hand, there can be no doubt that there is some relationship between difficult and demanding life situations and the occurrence of illness. A great majority of these Chinese (as well as a majority of the members of the American and Hungarian groups who were studied at other times) described many of their periods of illness as being associated with periods of hardship and difficulty.¹¹ The clue to the relationship appears to lie not so much in the nature of the life situations themselves as in the way that these situations are perceived by those who experience them. This was illustrated by some contrasts between the Chinese in the high- and low-frequency groups. Those who had had a great many illness episodes commonly had viewed their lives (or portions of them) as difficult, demanding, and unsatisfactory, whereas those who had had few illness episodes generally had viewed their lives as interesting, varied, and relatively satisfying. It seems evident that the occurrence of illness is less closely associated with situations which are "objectively" difficult to the external observer than it is with those situations which are perceived as difficult by the person who experiences the illness.

It is possible that this relationship between the occurrence of illness and the perception of the life situation may be one of parallelism. In other words, viewing life as threatening and unsatisfying may simply be a personality feature associated with whatever constitutional limitations of adaptive capacity lead to an increased susceptibility to illness. However, such a hypothesis does not provide a total explanation of the relationship between illness and

the perception of the life situation. The relationship between a man and his social environment is such that he can react only to his evaluation of the configurations which he perceives within it, rather than to the "actual" life situation itself, as it might be perceived by independent observers.² Laboratory experiments have demonstrated the widespread physiological changes that may take place as a part of the reaction to perceived situations, and have also demonstrated the frequency with which such physiological changes are evoked as a part of defensive reaction patterns when a situation is perceived as threatening.¹² Hence, it seems more likely that those who perceive their life situations as threatening, demanding, and unsatisfactory may become more susceptible to illness because of the physiological changes evoked during attempts to adapt to the threats which they perceive.

The observations of the present study lead one to prefer this hypothesis. The intellectual and social accomplishments of the frequently ill Chinese were at least the equals of those of the rarely ill Chinese, some of whom were "conspicuous failures." In terms of their responsibility to others, their dedication to principles, and the tenacity with which they pursued goals, the frequently ill Chinese sometimes exceeded the rarely ill, many of whom were self-centered, opportunistic, and without direction or purpose in life. In short, it appeared that some of the frequently ill Chinese viewed their lives as challenging, demanding, and full of conflict because, regardless of the situations in which they found themselves, they tried to abide by principles, to attain goals, or to pursue courses of behavior which might be unrealistic but which they regarded as praiseworthy and socially desirable. On the other hand, some of the rarely ill Chinese viewed their lives as easy, interesting, and varied, because they had not attempted to pursue any particular course in life. They were less bound by abstract principles, and they were more free in pursuing whatever line of behavior rebounded to their own benefit at

any given time. Thus, even though the externally observable facts of the lives of these two groups of Chinese were similar, it appeared that the frequently ill people were more often challenged and threatened by their life situations, and experienced more physiological and psychological disturbances as a result.

Conclusions

1. The members of this group of Chinese exhibited differences in their general susceptibility to illness such that 25 per cent of the individuals experienced approximately 50 per cent of all episodes of illness over a standard period of young adult life. Those having the greater number of episodes per unit time displayed a greater variety of syndromes, involving a greater number of organ systems, and falling into a greater number of etiological categories.

2. From the total sample, two groups of 10 were selected upon the basis of the number of episodes of illness experienced, the members of one group being frequently ill, and the members of the other rarely so. When the two groups were compared, the following observations were made:

- a. Family histories revealed no striking differences in the health or longevity of the kin; but many of the syndromes exhibited by the frequently ill are known to be familial in their occurrence.
- b. The lifetime experiences of the members of both groups were similar in most respects; members of both had faced many difficult life situations.
- c. In general, the frequently ill appeared to be more predictably oriented toward goals, duties, and responsibilities, and showed more concern about, and reaction to, the events and situations which they encountered.
- d. The more frequently ill commonly viewed their lives as difficult, demanding, and unsatisfactory, whereas the less frequently ill commonly viewed

their lives as interesting, varied, and relatively satisfying.

- e. Eight of the ten who were frequently ill viewed their relationships with their parents as having been unsatisfactory; a similar proportion of the less frequently ill viewed their relationships with their parents as having been satisfactory.
 - f. The frequently ill were more inner-directed, more self-absorbed, and more highly aware of emotional and interpersonal problems; whereas the less frequently ill had experienced little conflict or anxiety in their interpersonal relations, and showed little awareness of having emotional problems.
- 3 The findings suggest that the determinants of general susceptibility to illness are both genetic and environmental, but that the actual life situations encountered are less important in this respect than the way in which these situations are perceived. The differences in the number of illness episodes experienced by the members of these groups appear to be related in part to the fact that the more frequently ill people perceived their life experiences as more challenging, more demanding, and more conflict-laden, and experienced more disturbances of bodily processes and of mood, thought, and behavior as a result of their efforts to adapt to a greater number of perceived challenges.

References

1. HINKLE, L. E., JR., *et al.* The distribution of sickness disability in a homogeneous group of healthy adult men *Am J Hyg* 64:220, 1956.
2. HINKLE, L. E., JR., and WOLFF, H. G. The nature of man's adaptation to his total environment and the relation of this to illness. *A.M.A. Arch. Int. Med* 99 442, 1957.
3. HINKLE, L. E., JR., *et al.* Differences in general susceptibility to illness occurring among the members of a group of adult men over a twenty-year period. In press.
4. HINKLE, L. E., JR., and PLUMMER, N. Life stress and industrial absenteeism: The concentration of illness and absenteeism in one segment of a working population *Indust. Med & Surg.* 21 363, 1952.
5. HINKLE, L. E., JR., *et al.* Reports in preparation
6. *Standard Nomenclature of Diseases and Operations* (ed. 4) New York, McGraw-Hill 1952.
7. GOODELL, H., LEWONTIN, R., and WOLFF, H. G. "The Familial Occurrence of Migraine Headache. A Study of Heredity." In *Genetics and The Inheritance of Integrated Neurological and Psychiatric Patterns*, Res. Publ., A Nerv. & Ment. Dis. vol. 33, 1954.
8. GATES, R. R. *Human Genetics* New York, Macmillan, 1946, vol. 1, p. 192.
9. NEEL, J. V., and SCHULL, W. J. *Human Heredity*. Univ. Chicago, Chicago Press, 1954, pp. 20, 81
10. KALLMANN, F. J. "The Genetics of Psychotic Behavior Patterns." In *Genetics and The Inheritance of Integrated Neurological and Psychiatric Patterns* Res. Publ., A. Res. Nerv. & Ment. Dis., vol. 33, 1954
11. HINKLE, L. E., JR., *et al.* "Studies in Human Ecology: Factors Governing the Adaptation of Chinese Unable to Return to China" In *Experimental Psychopathology* New York, Grune, 1957, pp. 170-186
12. WOLFF, H. G. *Stress and Disease*. Publication #166, American Lecture Series, Monograph in Bannerstone Division of American Lectures on Physiology, ed. R. F. Pitts. Springfield, Ill., Thomas, 1953.
13. THETFORD, W. N. A cross-cultural approach to the study of personality and illness. To be published.